

***Laonome albicingillum*, a new fan worm species
(Polychaeta: Sabellidae: Sabellinae) from Taiwan**

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Abstract. — A new sabellid polychaete species, *Laonome albicingillum*, is described. The species is a dominant component of a mangrove estuary in northern Taiwan, and differs from all other currently recognized *Laonome* species in that it has thoracic neuropodial companion setae. An emended definition for the genus is provided.

During studies of benthic communities in a mangrove estuary in northern Taiwan, an undescribed sabellid species was discovered that occurred in densities of up to 19,000 individuals per m². This species, assignable to the genus *Laonome* Malmgren, is described herein. The types are deposited in the Institute of Zoology, Academia Sinica, Taipei, Taiwan (ASIZIP); the Allan Hancock Foundation Polychaete Collection of the Natural History Museum of Los Angeles County, California, U.S.A. (LACM-AHF); and the National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A. (USNM).

Family Sabellidae

Laonome Malmgren, 1866, emended

Type species. — *Laonome kroyeri* Malmgren, 1866 by monotypy.

Diagnosis. — Medium-size sabellin species with (usually) eight thoracic and numerous abdominal setigers. Axis of radiolar skeleton in cross section with two cells. Palmate membrane absent or present; radiolar flanges absent. Dorsal lips without dorsal radiolar appendages; dorsal pinnular appendages absent. Ventral lips fused. Parallel lamellae absent or present as a single medial lamella. Posterior peristomial ring collar present. Superior thoracic notosetae elon-

gate narrowly hooded; inferior setae paleate. Thoracic neuropodial uncini with series of small teeth above main fang, breast well developed, handles absent. Companion setae present or absent. Abdominal uncini with series of small teeth above main fang, breast well developed, handles absent.

Remarks. — This diagnosis is essentially the same as that provided by Fitzhugh (1989: 76–77; see also Fauchald 1977:139) except with regard to the presence of companion setae. Historically, *Laonome* has been defined by the combined absence of companion setae and handles on thoracic and abdominal uncini. Fitzhugh (1989) also included the absence of dorsal radiolar appendages as a feature denoting monophyly of the genus. The presence of companion setae in *L. albicingillum* does not affect recognition that this species is closely related to other members of the genus because the absence of both radiolar appendages and uncini handles are still sufficient to establish monophyly. However, Fitzhugh's (1989) diagnosis was based primarily on specimens of a single species, *Laonome kroyeri*, and the suite of characters of these two species may, upon examination of other species, indicate that they are representative of two related monophyletic groups, which may subsequently be recognized as separate genera or subgenera (T. Perkins, in litt.).

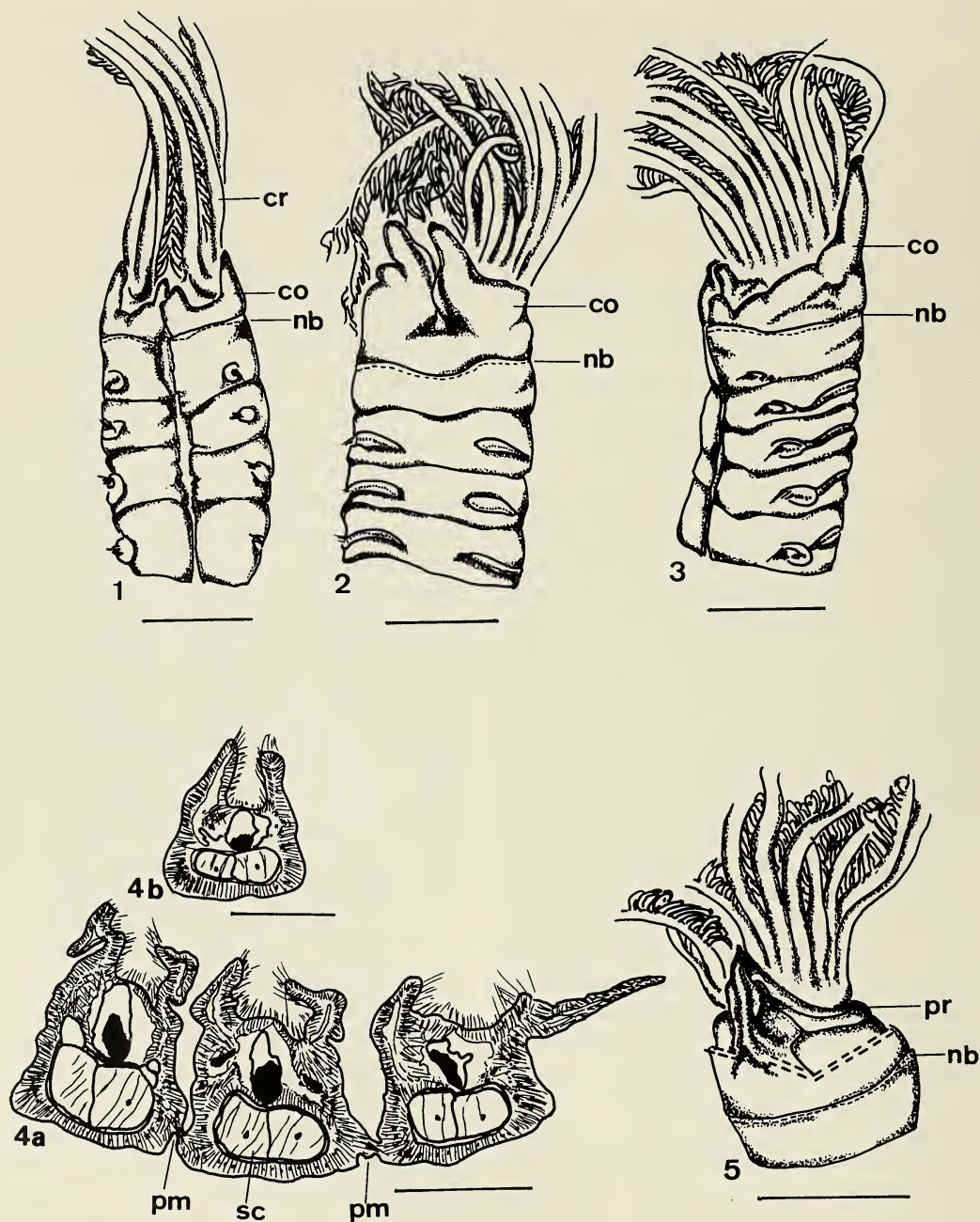
Laonome albicingillum, new species

Figs. 1–17

Material examined.—Intertidal mudflat, Chu-Wei mangrove swamp (25°10'N, 121°27'E), Tan-Shui estuary, Taipei County, northern Taiwan, 17 Mar 1992: holotype (ASIZIP 25), 17 paratypes (ASIZIP 22–24, 26–34, 37–41), 49 paratypes (LACM-AHF 1706). Same locality: Apr 1993, 1 paratype (ASIZIP 35). Same locality: 23 May 1994, 27 paratypes (USNM 170551).

Description.—Holotype complete, with 8 thoracic and 71 abdominal setigers; total body length 57 mm (branchial crown 6 mm), body width at collar 1.6 mm. Complete paratypes with 54–79 setigers, body (exclusive of crown) 13–52 mm long (crown 2–6 mm), width at collar 0.45–1.60 mm; most specimens with 8 thoracic setigers, some with 6 or 7. Branchial crown radioles without eyespots or pigmentation (Figs. 1–3). Branchial lobes each with 5–12 pairs of radioles in specimens with 54–79 setigers; number of radioles usually positively correlated with size of animal; radiole surfaces smooth, no appendages or flanges on outer margins (Figs. 1–3); radioles quadrangular in cross section. Axis of radiolar skeleton usually with two, occasionally four, rows of cells (Fig. 4). Palmate membrane joining radioles proximally at about $\frac{1}{10}$ of radiole length (Fig. 4a), very thin and transparent. Anterior peristomial ring not developed ventrally as a narrow lobe-like extension (Fig. 5). Dorsal lips triangular, fused with one another by thin lamella along ventral-most margins, just above mouth (Fig. 6). Dorsal lips without radiolar appendages (Fig. 6). Ventral lips quadrangular, extending from inner, ventral margins of branchial lobes, about $\frac{2}{3}$ length of dorsal lips (Figs. 6, 7). Ventral lips fused to one another along ventral midline (Fig. 7), extending ventrally as single lamella, fused to inner midventral margins of collar (Figs. 2, 7). Posterior peristomial ring collar completely separate middorsally (Figs. 1, 6) and midventrally

(Figs. 2, 7), midventral margins turned inward and fused with ventral lip lamella. Ventral collar margin about $\frac{2}{3}$ higher than dorsal (Fig. 3). Dorso-lateral collar margins with deep V- or U-shape incisions (Figs. 1, 3, 6). Midventral collar margins as narrow, elongate, triangular flaps (Figs. 2, 3). Anterior margin of setiger 1 completely encircled, except middorsally, by very narrow, white band (Figs. 1–3, 5, 6); best observed when specimen is stained with methyl green (see below). Setiger 1 separated externally from posterior peristomial ring by “inter-segmental groove.” Notosetal fascicles of setiger 1 situated slightly more dorsal than remaining thoracic notopodia (Figs. 1, 3). Setiger 1 fascicles slightly oblique; setae elongate narrowly hooded. Notosetal fascicles of setigers 2–8 with superior setal group forming arc over inferior transverse setal row (Fig. 8). Superior notosetae elongate narrowly hooded (Fig. 9); inferior notosetae paleate with mucronate tip (Fig. 10), 14–17 per fascicle. Thoracic neurosetal tori extend to ventrolateral margins of segments (Fig. 2). Ventral shields present but indistinct. Uncini with several rows of small, equal-size teeth above main fang; handles absent; breast well developed, expanded, extending beyond tip of main fang (Figs. 12, 13); 38–79 uncini per torus. Companion setae arranged as single row anterior to uncini, 34–54 per fascicle; distal end a thin, tear drop-shaped membrane terminating to a fine point (Fig. 11). Abdominal neurosetal fascicles arranged in two transverse rows in anterior setigers and single rows in posterior setigers. Anterior rows of anterior abdominal neurosetae elongate narrowly hooded (Fig. 15), posterior rows modified, elongate narrowly hooded (Fig. 16). Posterior abdominal neurosetae similar to setae in posterior rows but somewhat more elongate. Abdominal uncini similar to those of thorax (Fig. 14). Pygidium elongate, conical, distinct from last abdominal setiger (Fig. 17). Anus ventral, near anterior pygidium margin. Hermaphroditic. Live animals pale



Figs. 1-5. *Laonome albicingillum*, new species. 1, Paratype (ASIZIP 24), anterior end, dorsal view. Dashed line indicates narrow white band around setiger 1. 2, Holotype (ASIZIP 25), anterior end, ventral view. 3, Holotype (ASIZIP 25), anterior end, right side. 4, Paratype (ASIZIP 35), a, cross section of three radioles near base of crown shows thin palmate membrane and arrangement of skeletal axis cells. b, cross section of radiole in median region. 5, Paratype (ASIZIP 40), anterior end, ventro-lateral view, left side. Scale bar in Figs. 1-3 & 5: 1 mm; in Fig. 4: 100 μ m. Double dashed lines indicate collar being removed. co: collar; cr: branchial crown; nb: narrow white band; pm: palmate membrane; pr: anterior margin of anterior peristomial ring; sc: skeletal axis cell.

green; alcohol-preserved specimens light brown to cream colored. Tubes composed of mucus, fine mud, sand, and detritus. Methyl green staining patterns were as follows: first setigers deeply stained except the narrow white band and notopodia; radioles and dorsal and ventral lips not stained; margins of fecal groove in abdomen deeply stained; in anterior segments dorsal surface of body taking less stain than ventral surface but in posterior segments both surfaces well stained.

Etymology.—The specific name is derived from the Latin *albi*, whitish, and *cingillum*, little girdle, referring to the occurrence of a whitish narrow band on the anterior margins of setiger 1.

Habitat.—The type locality is an intertidal mud flat in a mangrove swamp adjacent to a river bank. Sediment salinity varies from 17–28‰, whereas salinity of the overlying water varies from 2–21‰. The median grain size diameter on the mud flat is from 0.06–0.14 mm, with a modal grain size diameter of 0.01–0.12 mm. The sediment silt and clay content ranges from 16–50%. Vegetation of the adjacent swamp is dominated by the mangrove, *Kandelia candel*.

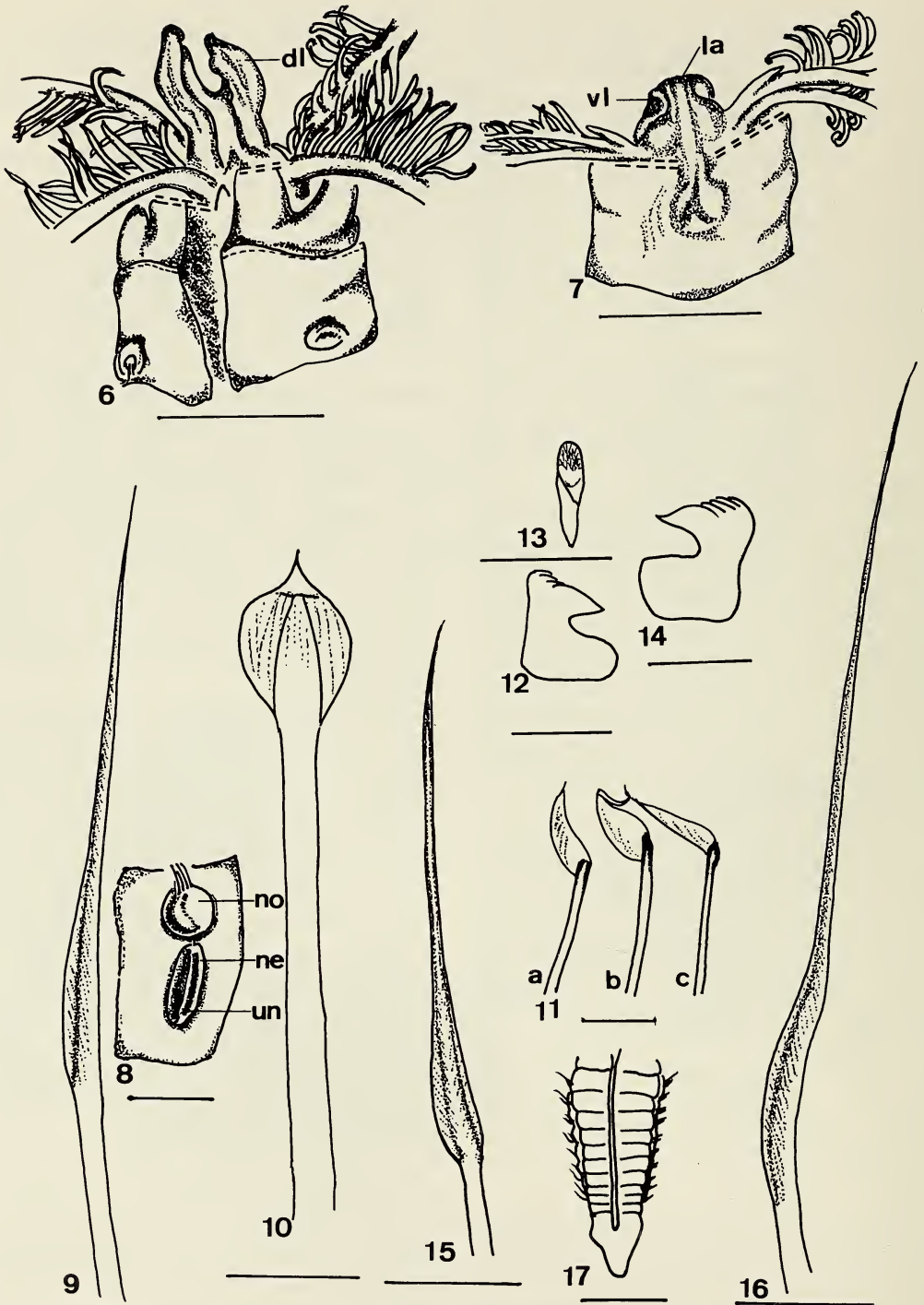
Reproduction.—*Laonome albicingillum* is hermaphroditic. Gametes are limited to the abdomen, with the 10 anteriormost setigers (setigers 9–19) producing oocytes and the following 20–30 setigers producing sperm. Coelomic oocytes are irregular in shape and spawned eggs are spherical, 140–160 μm in diameter. Spawning appears to occur from October to May. Embryos and larvae are planktonic with non-planktotrophic larval stage. Development from the fertilized egg to larval settlement only requires 26–33 hours.

Taxonomic remarks.—Of the 14 species that have been described as members of *Laonome* (cf. Hartman 1959, 1965; Hutchings & Murray 1984), exclusive of the current account, only the following five are now maintained in the genus: *L. kroyeri* Malmgren, 1866; *L. tridentata* Moore & Bush,

1904; *L. elegans* Gravier, 1906; *L. indica* Southern, 1921; and *L. triangularis* Hutchings & Murray, 1984. *Laonome albicingillum* is readily distinguished from these species by the presence of companion setae. In other respects, *L. albicingillum* closely resembles *L. indica* (Southern 1921: pl. XXX, fig. 26B) in that the midventral collar margin is well developed into a pair of elongate triangular processes. Except for these processes, the collar of *L. indica* appears to be of uniform height (Southern 1921: pl. XXX, fig. 26A). The collar of *L. triangularis* is oblique (Hutchings & Murray 1984: fig. 32.5), but lacks dorsolateral incisions. Most previous descriptions of *Laonome* species have not been very detailed with regard to the branchial crown. Thus, as to the presence or absence of a palmate membrane, closer inspection might reveal the systematic importance of this character in the genus. As regards the companion setae, their presence or absence also may be systematic important.

The midventral lamella which extends from the fused ventral lips to the ventral margins of the collar appears to be comparable to the parallel lamellae seen in many sabellids. It appears probable that in the case of *Laonome albicingillum* these lamellae are fused for most of their length, resulting in the presence of a single lamella. Southern (1921:653; pl. XXX, fig. 26B) described the presence of a “median lobe” in *L. indica* that appears very similar to the midventral lamella in *L. albicingillum*. Fitzhugh’s (1989, pers. comm.) definition of *Laonome* was based primarily on his examination of the type species, *L. kroyeri*, from which he inferred that species in the genus lack parallel lamellae. As he made no further distinctions in this character, the presence of what are presumed to be fused lamellae in *L. albicingillum* might be of systematic importance.

Until all other *Laonome* species can be examined, I do not know to what extent the white band at the anterior margin of setiger



Figs. 6-17. *Laonome albicingillum*, new species. 6, Paratype (ASIZIP 26), dorsal view of dorsal lips. 7, Paratype (ASIZIP 27), ventral view of ventral lips. 8, Paratype (ASIZIP 22), lateral view (left side) of setiger 5 showing arrangements of superior and inferior noto- and neurosetal fascicles. 9, Paratype (ASIZIP 22), elongate, narrowly hooded seta from setiger 3. 10, Paratype (ASIZIP 22), paleate seta from setiger 3. 11, Paratype (ASIZIP

1 can be of diagnostic use. This band may be similar to the so-called postsetal "glandular" girdle that has been reported in several sabellid genera, such as *Euchone* (Banse 1970) and *Potamethus* (Knight-Jones 1983). These "glandular" girdles are, however, located on setiger 2 and are postsetal.

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Literature Cited

- Banse, K. 1970. The small species of *Euchone* Malmgren (Sabellidae, Polychaeta).—Proceedings of the Biological Society of Washington 83:387–408.
- Fauchald, K. 1977. The polychaete worms. Definitions and keys to the orders, families and genera.—Natural History Museum of Los Angeles County, Science Series 28, 188 pp.
- Fitzhugh, K. 1989. A systematic revision of the Sabellidae-Caobangiidae-Sabellongidae complex (Annelida: Polychaeta).—Bulletin of the American Museum of Natural History 192:1–104.
- Gravier, C. 1906. Sur les Annélides polychaètes de la Mer Rouge (Sabellides).—Bulletin du Muséum d'Histoire Naturelle, Paris 12:33–43.
- Hartman, O. 1959. Catalogue of the polychaetous annelids of the world.—Allan Hancock Foundation Publication, Occasional Paper No. 23, Part 1. Los Angeles, 628 pp.
- . 1965. Catalogue of the polychaetous annelids of the world.—Allan Hancock Foundation Publication, Occasional Paper No. 23, Part 2. Supplement (1960–1965) and index. Los Angeles, 197 pp.
- Hutchings, P. A., & A. Murray. 1984. Taxonomy of polychaetes from the Hawkesbury River and the southern estuaries of New South Wales, Australia.—Records of the Australian Museum Supplement 3:1–118.
- Knight-Jones, P. 1983. Contributions to the taxonomy of Sabellidae (Polychaeta).—Zoological Journal of the Linnean Society 79(3):245–295.
- Malmgren, A. J. 1866. Nordiska Hafs-Annulater.—Öfversigt af Svenska Vetenskaps Akademiens Forhandlingar, Stockholm, 22:400–401.
- Moore, J. P., & K. J. Bush. 1904. Sabellidae and Serpulidae from Japan with descriptions of new species of *Spirorbis*.—Proceedings of the Academy of Natural Sciences of Philadelphia 56:164–179.
- Southern, R. 1921. Polychaeta of the Chilka Lake and also of fresh and brackish waters in other parts of India.—Memoirs of the Indian Museum Calcutta 5:652–653.

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25), a, companion seta from setiger 6; b,c, from setiger 4. 12, Paratype (ASIZIP 23), thoracic uncinus from setiger 3, lateral view. 13, Paratype (ASIZIP 22), thoracic uncinus from setiger 3, frontal view. 14, Paratype (ASIZIP 22), abdominal uncinus from setiger 11, lateral view. 15, Paratype (ASIZIP 37), elongate narrowly hooded seta from anterior row of neurosetal fascicle, setiger 10. 16, Paratype (ASIZIP 37), elongate narrowly hooded seta from posterior row of neurosetal fascicle, setiger 10. 17, Paratype (ASIZIP 29), posterior end of body, ventral view. Scale bar in Figs. 6 & 7: 1 mm, in Figs. 8 & 17: 500 μ m, in Figs. 9 & 10, 13, 15 & 16: 50 μ m, in Figs. 11 & 12, 14: 25 μ m. dl: dorsal lips; la: ventral lip lamella; ne: neurosetal fascicles; no: notosetal fascicles; un: uncini; vl: ventral lips. Other indications are same as in the previous figures.